

# Vertical Profiling Device: “Elbertson”

Elbertson is a vertical profiling device designed by Deep Sea Dogs to be compact, cost-efficient, and effective in a wide range of marine environments.

## Design

Elbertson utilizes an acrylic tube with a 100mm diameter and 350mm height as its exterior structure, making it incredibly compact and easy to transport. Two 3D-printed PETG endcaps are used to seal the vehicle, with recycled rubber cutouts placed between the caps and interior to make it waterproof. Three holes are cut out in the bottom cap for the pressure sensor, water inlet tube, and pressure release valve. External rods are used to clamp the endcaps together, ensuring a tight seal.

## Propulsion

Elbertson uses a buoyancy engine consisting of an aquarium water pump connected to a collapsible drinking bag. As the motor pumps water into the drinking bag, air is pushed out of the device through the pressure release valve. This causes the device to weigh more than the water it is displacing, making it sink. To return to the surface, water is pumped out of the drinking bag, causing the device to rise.

## Data

Elbertson contains multiple sensors connected to an ESP32 control board, situated at the top of the vehicle. The ESP32 control board can collect data on pressure, depth, and elapsed time as it dives and resurfaces. During operation, the ESP32 will perform a vertical profile once commanded by a surface-based receiver. After completing a vertical profile, the ESP32 will reconnect to the receiver and relay the collected data for processing.

